When a Standard Candle Flickers: Crab Nebula Variations in Hard X-rays

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In the first two years of science operations of the Fermi Gamma-ray Burst Monitor (GBM) since August 2008, a ~7% (70 mcrab) decline was observed in the overall Crab Nebula flux in the 15 - 50 keV band, measured with the Earth occultation technique. This decline is independently confirmed in the ~15-50 keV band with four other instruments: Swift/BAT, the RXTE/PCA, INTEGRAL/IBIS, and INTEGRAL/SPI. A similar decline is also observed in the ~3-15 keV data from the RXTE/PCA and in the 50-100 keV band with GBM, Swift/BAT, INTEGRAL/IBIS, and INTEGRAL/SPI. The pulsed flux measured with RXTE/PCA since 1999 is consistent with the pulsar spin-down, indicating that the observed changes are nebular. Correlated variations in the Crab Nebula flux on a ~3 year timescale are also seen independently with the PCA, BAT, IBIS, and SPI from 2005 to 2008, with a flux minimum in April 2007. As of April 2011, the Crab nebula flux has stopped declining and may be beginning to increase. We will present updated results on our multi-instrument study of long-term Crab nebula variations.